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REPUBLIC OF SOUTH AFRICA

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REPUBLIEK VAN SUID-AFRIKA

EPARTEMENT VAN HANDEL
NYWERHEID

DEPARTMENT OF TRADE AND
INDUSTRY

Hiermee word gesertifiseer dat
This is to certify that

the documents annexed hereto are true copies of:

Application form P.1, P.2 and provisional specification of South African Patent No. **2002/6532** as originally filed in the Republic of South Africa on 15 August 2002 in the name of **BALMORAL TECHNOLOGIES (PROPRIETARY) LIMITED** for an invention entitled **"METHOD OF PRODUCING A HYDRAULIC BINDER OR THERMOPLASTIC CONTAINING PRODUCT".**

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Gete[illegible]ETORIA in die Republiek van Suid-Afrika, hierdie **4th** dag van **November 2003**
Sign[illegible] in the Republic of South Africa, this day of

Registrateur van Patente

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

APPLICATION FOR A PATENT

AND ACKNOWLEDGEMENT OF RECEIPT
(Section 30 (1) – Regulation 22)

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REPUBLIEK VAN SUID AFRIKA

The granting of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicate

OFFICIAL APPLICATION NO.		S&F REFERENCE
21 01	2002/6532	PA133711/P

FULL NAME(S) OF APPLICANT(S)

71 BALMORAL TECHNOLOGIES (PROPRIETARY) LIMITED

ADDRESS(ES) OF APPLICANT(S)

BUILDING 16, CSIR CAMPUS, MEIRING NAUDE ROAD, SCIENTIA, PRETORIA, GAUTENG, SOUTH AFRICA

TITLE OF INVENTION

54 METHOD OF PRODUCING A HYDRAULIC BINDER OR THERMOPLASTIC CONTAINING PRODUCT

THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. THE EARLIEST PRIORITY CLAIM IS:

COUNTRY: NIL NUMBER: NIL DATE: NIL

~~THIS APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO.~~

21 01

~~THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND IS BASED ON APPLICATION NO.~~

21 01

THIS APPLICATION IS ACCOMPANIED BY:

- ☒ 1. A single copy of a provisional specification of 7 pages.
- ☒ 2. Drawings of 1 sheet.
- ☐ 3. Publication particulars and abstract (Form P.8 in duplicate).
- ☐ 4. A copy of Figure of the drawings (if any) for the abstract.
- ☐ 5. Assignment of invention.
- ☐ 6. Certified priority document.
- ☐ 7. Translation of the priority document.
- ☐ 8. Assignment of priority rights.
- ☐ 9. A copy of the Form P.2 and the specification of S.A. Patent Application No .
- ☐ 10. Declaration and power of attorney on Form P.3.
- ☐ 11. Request for ante-dating on Form P.4.
- ☐ 12. Request for classification on Form P.9.
- ☒ 13. Form P.2 in duplicate.
- ☐ 14. Other.

74 ADDRESS FOR SERVICE: SPOOR & FISHER, SANDTON

Dated: 15 August 2002

SPOOR & FISHER
PATENT ATTORNEYS FOR THE APPLICANT(S)

RECEIVED

REGISTRAR OF PATENTS, TRADE MARKS AND COPYRIGHT

15 AUG 2002

REGISTRAR OF PATENTS

REPUBLIC OF SOUTH AFRICA | REGISTER OF PATENTS | PATENTS ACT, 1978

OFFICIAL APPLICATION	LODGING DATE: PROVISIONAL	ACCEPTANCE DATE
21 01 2002/6532	22 15 AUG 2002	47
INTERNATIONAL CLASSIFICATION	**LODGING DATE: COMPLETE**	**GRANTED DATE**
51	23	

FULL NAME(S) OF APPLICANT(S)/PATENTEE(S)

71 BALMORAL TECHNOLOGIES (PROPRIETARY) LIMITED

APPLICANTS SUBSTITUTED:	DATE REGISTERED
71	

ASSIGNEE(S)	DATE REGISTERED
71	

FULL NAME(S) OF INVENTOR(S)

72 SYMONS, MICHAEL WINDSOR

PRIORITY CLAIMED	COUNTRY	NUMBER	DATE
N.B. Use International abbreviation for country (see Schedule 4)	33 NIL	31 NIL	32 NIL

TITLE OF INVENTION

54 METHOD OF PRODUCING A HYDRAULIC BINDER OR THERMOPLASTIC CONTAINING PRODUCT

ADDRESS OF APPLICANT(S)/PATENTEE(S)

BUILDING 16, CSIR CAMPUS, MEIRING NAUDE ROAD, SCIENTIA, PRETORIA, GAUTENG, SOUTH AFRICA

ADDRESS FOR SERVICE	S & F REF
74 SPOOR & FISHER, SANDTON	PA133711/P

PATENT OF ADDITION NO.	DATE OF ANY CHANGE
61	

FRESH APPLICATION BASED ON	DATE OF ANY CHANGE

SPOOR & FISHER

FORM P.6

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

PROVISIONAL SPECIFICATION

(Section 30(1) – Regulation 27)

OFFICIAL APPLICATION NO.		LODGING DATE	
21	01 2002/6532	22	15 AUGUST 2002

FULL NAMES OF APPLICANTS

71	BALMORAL TECHNOLOGIES (PROPRIETARY) LIMITED

FULL NAMES OF INVENTORS

72	SYMONS, MICHAEL WINDSOR

TITLE OF INVENTION

54	METHOD OF PRODUCING A HYDRAULIC BINDER OR THERMOPLASTIC CONTAINING PRODUCT

BACKGROUND OF THE INVENTION

This invention relates to a method of producing a product from a flexible open cell polymeric foam element and a hydraulic binder or a thermoplastic material, and to the product so made, and is an addition to, improvement in or modification of the invention described in South African Patent Application No 2002/5395.

The invention described in SA Patent Application No 2002/5395 is a method of producing a product from:

(a) a flexible open cell polymeric foam element; and

(b) a hydraulic binder slurry;

which includes the steps of:

(i) introducing the hydraulic binder slurry into the open cells of the foam element by compressing the foam element to exclude air from the open cells and then releasing the compression with the foam element in contact with the hydraulic binder slurry so that the hydraulic binder slurry

penetrates and becomes contained in the open cells of the foam element; and

(ii) allowing the hydraulic binder to set and dry to form the product.

Several embodiments of the invention are described in SA Patent Application No 2002/5395. In one embodiment, in step (1), the foam element is submerged in the hydraulic binder slurry, and while submerged, the foam element is compressed to exclude air from the open cells. The compression is then released so that the slurry penetrates and becomes contained in the open cells. In a second embodiment of the invention, in step (1), the hydraulic binder slurry is applied to a surface of the foam element prior to the foam element being compressed to exclude air from the open cells. In a third embodiment, in step (1), the hydraulic binder in dry powder form is placed on the foam element, which hydraulic binder is slurried with water, whereafter the foam element with the hydraulic binder slurry thereon is compressed to exclude air from the open cells.

SUMMARY OF THE INVENTION

In a fourth embodiment of the invention, in step (1), the foam element is compressed to exclude air from the open cells, and while compressed or as the compression is released, a hydraulic binder slurry is applied to a surface of the foam element. As the compression is released the slurry penetrates and becomes contained in the open cells.

This step may be repeated.

The compression of the foam element in step (1) is carried out by passing the foam element between a first roller and a surface, for example a second roller.

The hydraulic binder slurry is preferably applied to a surface of the foam element directly by at least one of the first and second rollers.

This may be achieved by providing the or each roller with a perforated surface for contacting a surface of the foam element and a hydraulic binder slurry feed arrangement for feeding the hydraulic binder slurry to the perforated surface of the or each roller for application to a surface of the foam element.

It has also been found that thermoplastic materials can be used instead of hydraulic binders in the method of the invention. Thus, the method of the invention as described above, in particular that described in the fourth embodiment of the invention, includes producing a product from:

(b) a thermoplastic material.

The thermoplastic material is preferably a thermoplastic composition selected from the group consisting of polystyrene, polyethylene, polypropylene, polyvinyl chloride, polyvinyl acetal, A.B.S, bitumen, and C-Fix by Shell, or any compatible combination, mixture or blend thereof.

In particular, the thermoplastic composition is a molten thermoplastic composition.

BRIEF DESCRIPTION OF THE DRAWING

Figure 1 is a schematic diagram of a further embodiment of the method of the invention

DESCRIPTION OF EMBODIMENTS

A fourth embodiment of the method of the invention described in SA Patent Application No 2002/5395 is illustrated schematically in Figure 1. Referring to Figure 1, a flexible open cell polymeric foam element 10, which may be either a continuous sheet or a discrete element, which may be flat or shaped, is transported on a conveyor 12 between two rollers 14, 16 between which the foam element 10 is compressed.

The rollers 14, 16, in this embodiment, are revolving perforated hollow feed tube rollers that include solid stationary cores 18, 20, respectively. The cores 18, 20 include respective feed conduits or channels 22, 24 for conveying a hydraulic binder slurry to the rollers 14, 16 and respective feed passages 26, 28 for feeding the hydraulic binder slurry to the perforated surfaces 30, 32.

The hydraulic binder slurry then contacts the surfaces 34, 36 of the foam element 10, whilst compressed and/or as compression is released, and then penetrates and becomes contained in the open cells of the foam element 10 as compression is released on exiting the rollers 18, 20.

On exiting the rollers 18, 20 the impregnated foam element 10 regains its original size and shape. The foam element 10 now containing the hydraulic binder slurry may be passed through a second set of perforated hollow tube rollers 38, 40, where the abovementioned method may be repeated. In addition, the impregnated foam element 10 may be passed between an optional third set of hollow feed tube rollers 42, 44 which only, partially compress the foam element 10 thereby resulting in partial impregnation of the outer regions of the foam element 10 to form integrated solid or semí-sold outer skins 46, 48.

The foam element 10 now containing the desired content of hydraulic binder slurry can then be further treated as described in SA Patent Application No 2002/5395.

In the first embodiment of the method of the invention described in SA Patent Application No 2002/5395, as mentioned above, the foam element is submerged in the hydraulic binder slurry, and while submerged, the foam element is compressed to exclude air from the open cells. The compression is then released so that the slurry penetrates and becomes contained in the open cells. A potential difficulty in using such a method is that when water is added to a hydraulic binder, hydration immediately commences and even in a continuous process the binder slurry in a bath or container will, in a relatively short period of time, produce lumps, accumulations or granules of set or partly set hydraulic binder at different stages of the hydration process. In some cases, such as gypsum, the hydration process can be almost indefinitely retarded, but this requires added cost and at some point in the process, either the retardation must be neutralised or the hydration accelerated to overcome the retarder.

A further potential difficulty in impregnating the open cellular foam in a bath in which it is submerged is that when it is removed from the bath, the relatively high viscosity of the slurry on top of the emerging impregnated foam means that it must be removed unless the sheet exits the bath vertically. This difficulty is particularly true of sheet material.

In addition to obviating the above potential difficulties of submersion of the foam element, this fourth embodiment of the invention allows for the degree of impregnation to be accurately controlled by pressure of the binder and the speed of the feed rollers. Further, the system is self-purging, preventing the accumulation of set or semi-set hydraulic binder. Further, it makes provision for varying the reology or apparent viscosity of the slurry without process

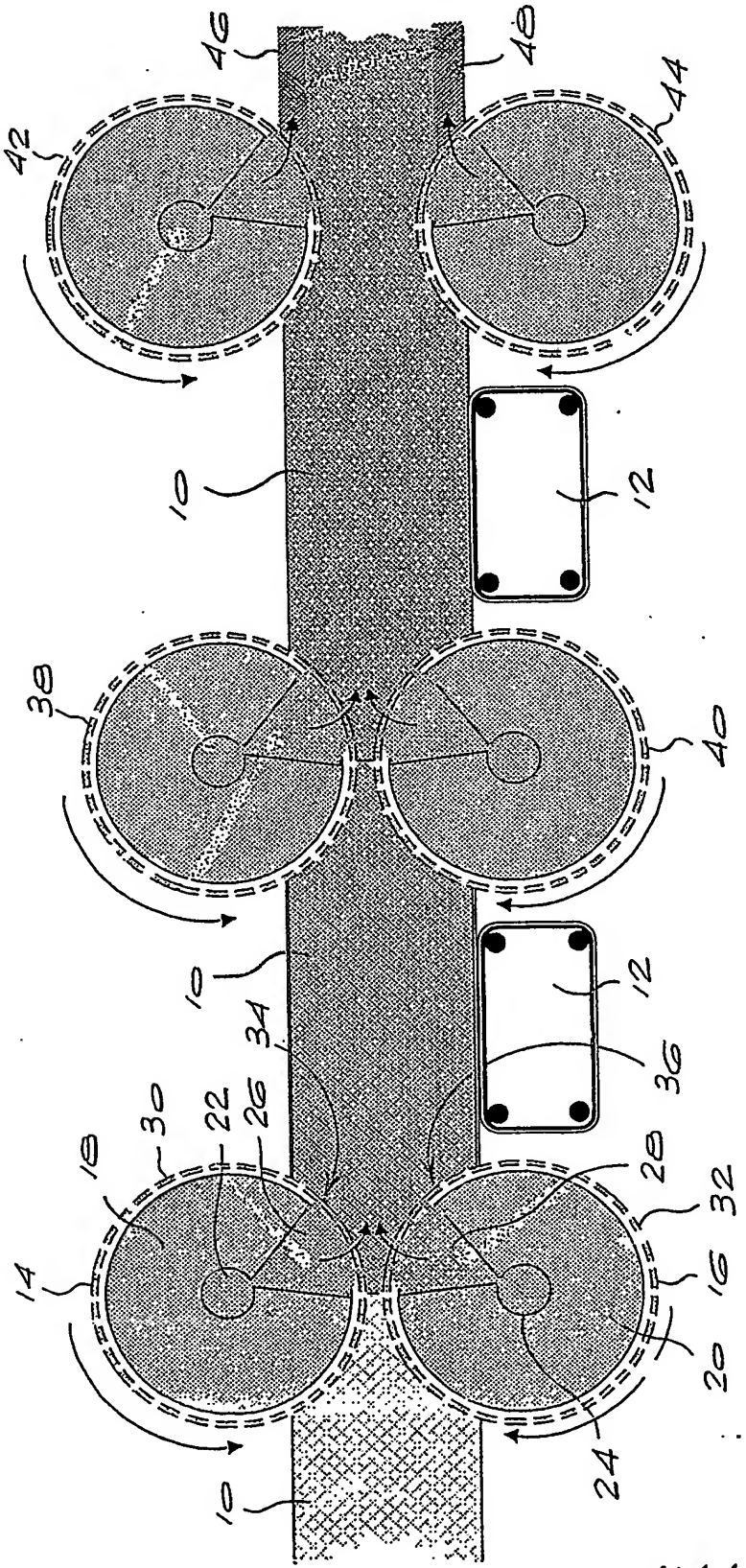
difficulty, because it is under positive pressure and is forced into the foam. It also allows for the inclusion of a heavily or totally impregnated outer layer for added strength and water resistance of the final product. The system is easy to clean and easy to maintain and the slurry is easily maintained at a specific temperature by heating the stationary solid cores of the perforated rollers.

As indicated above, there may be used instead of the hydraulic binder slurry a thermoplastic material, typically a thermoplastic composition. The thermoplastic composition, which is preferably molten for ease of processing, may be selected from the group consisting of polystyrene, polyethylene, polypropylene, polyvinyl chloride, polyvinyl acetal, A.B.S, bitumen, and C-Fix by Shell, or any compatible combinations, mixtures or blends thereof, including those from recycled waste polymer or refinery products.

C-Fix, which is manufactured by Shell, is a composition that comprises from 70 to 99% by weight of solid particles and from 1 to 30% by weight of a hydrocarbonaceous binder, which binder contains (i) from 15 to 95% by weight, based on total binder, of asphaltenes, which asphaltenes contain at least 60% aromatic carbon, and (ii) from 5 to 85% by weight, based on total binder, of further hydrocarbons, with the proviso that the solid particles are not solely carbon particles. The composition may be melted at temperatures of the order of 180°C. In the case of blends of thermoplastic compositions, with or without small particles of inorganic or organic extenders, which particles will be of the order of 100 microns, preferably of the order of 50 microns and smaller, these are typically processed at temperatures in the range 140°C to 250°C, more preferably in the range 170°C to 220°C, provided that the process temperature is below the melt point or decomposition point of the open cell polymeric foam. The temperature is maintained by heating the static cores from which the molten material is impregnated into the expanding foam. Cooling is then rapid to form a rigid light weight composite.

Dated this 15TH day of August 2002

SPOOR & FISHER
APPLICANT'S PATENT ATTORNEYS



SPOOR & FISHER
Applicant's Patent Attorneys

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